132 There are further local variations. Thundershowers often occur over a limited area. This precipitation is described by Okinawans as katabui, by which they mean a scattered, here-and-there rainfall.

[131] These variations in rainfall throughout the year and from year to year are the source of complaints of drought, frequently heard in the summer growing and fall harvesting season from July to October. [217] Dr. Green of Commodore Perry's staff mentions that droughts were spoken of in an official Loochoo document.

[134] There is also hidden drought caused by the rapid runoff of water and the absorption of water by permeable soils and quick subterranean drainage. [133] Water for crop growth is thus immediately dependent upon rainfall which must be immediately used before it becomes inaccessible. There are no snowy mountains to store the water for gradual use.

Since it is in a zone of mixture of warm and cold air, Okinawa is cloudy a great deal of the year. The days with the highest percentage of sunshine occur from June to October. There is very little condensation near the surface and fog is uncommon.

Relative humidity is high throughout the year. On the average, it does not fall below 74% (in December), and the highest average is 85% in June. This condition produces a hot humid summer, often with overcast skies and it also brings about a felt or sensible temperature much colder in winter than the temperature would indicate. Okinawan winters may be cold, especially with the winds from the northeast and east northeast. Blankets and heavy clothing do not hold the bodily heat. The insulating value of clothing and blankets seems to be reduced.

Okinawa is also affected by monsoonal influences in southern Asia. In the summer, the basic factor is the heating of large masses of continental air, the creation of low pressure areas, and the transport of air from the ocean to the continent. Prevailing winds are from the east, south, or south south east, or east south east, but here the prevailing should be stressed. Actually in a given period winds may shift and flow from varying directions.

In the winter, it is the air over the ocean that is warmer and the dry air from the cold high pressure areas blows out over the island. Prevailing winds from October through January are from the northeast. Though the mean velocities are modest, strong winds are recorded for every month in the year, winds either from the continent, or typhoons originating in the oceans north of the equator.

132 133 Another modifying factor is the Japanese current (Kuroshio). This current is really part of the North Equatorial current thought to have its origin on the Pacific side of Central America. As the current crosses the Pacific, it gets added colder water from the California current, and is further mixed with tropical and north Pacific waters, and later with western North Pacific waters. The North Equatorial current divides east of the Philippines, its northern arm going along the east side of the

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

4

The Disappointing Soils

Okinawa is small and has a large population. Agriculture has been and will continue to be the main source of livelihood for the people. For this reason, a consideration of the nature of its soils has practical interest. The soils of Okinawa fortunately have recently been surveyed, classified, mapped, and computations made of the approximate areas of each soil type.[7]

Estimated Acreage on Okinawa Island

1. The alluvial soils of the coastal flats and flood plains (Akamaru and Aha soils). About 80% of these are the gray clays given over to rice fields, and 20% in the brown and well drained Aha soils. These soils have no distinct profile, average more than six feet in depth, are slightly to medium acid. Deep and fertile, they are composed of loam, clay loam, and sandy loams. They are scattered over the island, frequently at the heads of bays or inlets where the short rivers come to the sea. The most conspicuous occurrences are in the Northern region, including the Motobu peninsula. They are much less frequent in the central district, and scarce in the southern district, with the most conspicuous spots along the Minatogawa river and the headwaters of a small stream south of Minatogawa. These soils are level or almost level (surface gradient 0-1.3%). The water table is seldom more than two feet below the surface. 10,900

[Text continues on TOP of P. 19 -- Analyst]

7 The following materials have been used: (1) Soils of Okinawa, 11 sheets, controlled photomaps, with soil map overprint, prepared under the direction of the Engineer, Far Eastern Command, by various staff members of the US Geological Survey, Dept. of the Interior, and the Soil Survey of the USDA. (2) Okinawa Soils, a more generalized map, on one sheet (1:1,000,000) prepared by the Military Geology Branch, USGS, for the Intelligence Division, Office of the Engineer, GHQ, FEC, 1951. This is a map of dominant soil types. The analysis here is based on this unclassified map. See also the discussion in Nuttonson, as cited, 37-48. The writer wishes to acknowledge the courtesy and assistance of Mr. Sherman Neuschel, Chief, Military Geology Section, FEC, and Mr. Carl Stensland, Soil Scientist, who participated in the survey of Okinawan soils. In Tokyo on my return, I profited from my discussions with Dr. Stensland, who also furnished me with grid computations for the village areas in which I was interested.

Estimated Acreage on Okinawa Island

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[311]

2. The alluvial clays of the coastal flats and flood plains (Awase clay). These are also deep and fertile. Lack of water prevents extensive rice cultivation. About 60% of the area is in sweet potatoes and other dry land crops, another 30% in settled areas or military installations, and 10% in rice. These are olive, gray colored soils, of calcareous clay. They also have a low surface gradient. The water table is close to the surface, about two feet on the coasts, and near the surface in the interior valleys, except that in dry periods, it might be five feet below the surface or entirely absent. The soils are slowly permeable and slowly drained. They are almost absent from the north, common but scattered in the central and southern regions. About three-fourths of the area is found on coastal flats and one fourth on the bottoms of inland valleys. The greatest area is the coastal strip along Buckner Bay from the Katchin peninsula to Yonabaru, Bucknerville, most of the perimeter of the Chinen peninsula, a narrow strip in the Sukiran, Camp Kue coastal area, and another strip along the coast south of Naha. 16,200

[311]

3. The grayish brown loamy soils (Shioya loamy sand) with limestone grains, minor impurities and some organic matter, usually resting on coral sand. The soils, too porous for rice culture, have low fertility, and are nearly level on the raised beaches. They are widely scattered along the entire coast, but the individual patches are very small. Due to low fertility and the small area, the soils are not important. 2,650

4. The clay loams and the stony clays (Okinawa clay loams and Chinen stony clays). Both occur on limestone plains. These are fertile and well drained. "Both are very crumbly, or strongly granular; although clayey and plastic, they are porous, permeable, and of good tilth." Generally these soils are neutral with a tendency toward acidity when depth to limestone exceeds ten or fifteen feet. Seventy percent of this group is the Okinawan clay loam, with a top soil of a dark brown clay loam five to ten inches thick. Of the clay loams, totalling 30,500 acres, 22,400 have a surface gradient of 2-8%; 5200, 8-15% and 2900, 15-25%. 30,500

The stony clay (Chinen stony clays), "the shallow stony soil occupying 30% of the unit, consists of dark-brown to brown clay or clay loam with loose fragments and outcrops of the limestone bedrock." Stone occupies 10-30% of the surface of these soils. Over half of the 12,000 acres is gently sloping (2-8%), the remainder being steeper (8-15%) 12,000

	Estimated Acreage on Okinawa Island
These soils on limestone plains are found chiefly in the central region, the extreme south, and along the northern coast of the Motobu peninsula. There are sizeable individual units throughout the island and on the offshore islands. These soils were found in the environs of all the villages studied.	134 ● 133
5. The gently sloping Shuri clays. They are olive colored calcareous clays, slowly drained and moderately fertile. They are scattered in the central and southern regions.	9,300
6. The Upland Shuri Clays and rough broken land. The crumbly clay soils are "over bedrock of compact impervious clay." Sixty percent of the unit resembles the Shuri clays, but the soils are shallower and the slope is steeper. The steep areas are even shallower, and there are frequent outcrops of raw clay bedrock.	
Sloping and hilly upland 18,200 Steep escarpments 11,200	29,400
These soils dominate the landscape of the eastern part of the central region and much of the south. They are not found to any degree in the northern area. The gentler sloping parts are in dry land crops, but much is also idle land. The steep parts are in grass or in brush, the familiar genya land.	[311]
7. The Ishikawa loams. These are deeply drained acid soils of low fertility. The thin surface is of a pale brown friable loam. It is an area suited to forestry. Of the 42,780 acres in the unit, 4480 are moderately steep, 3400 hilly, and 34,900 steep.	42,780
8. The shallow and acid soils of the mountains and hilly upland. These are the soils of low fertility of the northern forested area. They are shallow light colored acid loams with a prevailing gradient of 50-100%.	119,000
9. Rough stony land of limestone mountains and steep slopes. These patches occur in narrow ribbons throughout the island, but are most conspicuous along the Motobu peninsula, and the central region. The finger like ridges of the extreme south are notable examples.	14,900
If these acreage estimates are summarized showing the approximate areas for different types of land use, the	311

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

311 magnitude of the land problem stands out clearly:

Type of Use	Acreage
Total	287,630
Rice Fields	10,420
Dry Land Crops	57,715
Town Sites, Military Uses, etc.	19,595
Shrub, Grasses, Stony Land, Escarpments	27,800
Forest	153,900
Not Broken Down a/	18,200

a/ Probably mostly cultivated land with some in town sites, some idle, some in military installations.

What stands out is the high percentage of land in forest, shrub, grasses, stony land and escarpments that has little promise for future utilization. These soils now probably enjoy their best utilization.

[118] With a growing population and more economic activity, it is likely that areas in man made installations and settlement will increase, not decrease, and that further land for these purposes will come, not from the stony or forested soils, but from the arable land.

The soil survey documents what is apparent to general observation that the soils suitable for rice, and having water for its successful growth, are a minor percentage of the total area. The chief foods, it is apparent, must continue to come from dry land crops and slope cultivation.

● 134 311 Even though agriculture is and will continue to be the basis of the islanders' economic life, the lack of suitability of the soils for this purpose is especially striking. Improvement of agriculture, introduction of better methods of farming, the increased use of fertilizers, while effective, could only be a palliative when the total arable land for over five hundred thousand people is in the magnitude of 86,000 acres, if we include all the 18,200 acres in the above table which are not broken down. Even if this figure is too low, the mere fact that over 180,000 of the 287,630 acres is in forest, or shrub, grass, or stony land, and of low fertility is sufficient indication of the land use problem. These facts are supported by farmers' own appraisals of the nature of the soils of their island.

161 133 311 The following table, even if inaccurate, certainly states the problem in its proper magnitude:

Table 3

Population of Okinawa Island, 1950	517,600

The village is one of a series of settlements in a long narrow valley, on a limestone plain, bordered on the east by a steep ridge, up to 300 feet in elevation and running in a northwest and southeast direction, which divides the valley from the sea. On these cliff like formations, large outcrops are covered with shrubs and miscanthus grass. Lanes and roads lead from the valley floor to the summits of these hills, where villagers collect their firewood and grass for roof thatch. On the rocky, steep slopes of this seaward ridge, above the line of cultivation, is the tomb area. Precipitous and stony hills prevent cultivation, but occasionally a sharp tongue of land reaches far up the slope, its end protected from the rains and wash by a short stone fence.

Between Gushichan and Hanashiro village, there is a bridge over a small stream, its upstream course obscured by its dispersion in the rice fields. The dirt road, gradually ascending, cuts through the main rice growing area of the village, on a gentle slope, reflected in the bench cultivation of the rice fields. Here and there are large rocks and stony outcrops, with an occasional scrub pine, cycad, or a covering of miscanthus. Cultivation goes around these large stones.

The road, about one-fourth of a mile from the bridge, soon leads into what looks like, from a distance, a densely wooded area. This is the settlement.

With the exception of the rough stony land of the limestone mountains and steep slopes, the soils of the area are the Okinawa clay loams and the Chinen stony clays lying on the limestone plains. The farm and village area takes up approximately 427 acres, of which 257 are in gently sloping Okinawa clay loams, a deep, well drained, neutral to slightly acid and very fertile soil. Another five acres is of the same type but these are in slopes, of a gradient ranging from 8-15%. There are 80 acres in gently sloping Shuri clays, shallow, moderately fertile, an olive colored, crumbly, calcareous clay; another 35 acres in the Awase clays, deep fertile, crumbly, calcareous clay of olive-gray color, and 14 acres of rough stony land.

The hillsides and the summits are free of densely growing trees and shrubs, and the lowlands are given over to cultivation. There are no groves of trees to protect the crops from typhoons. The trees and the protection they give are confined to the village. This is typical of many villages of southern Okinawa, where the hills and mountains have few trees, and dense growths are associated with habitation.

Inside the village, winding lanes branch off the main dirt road. The older houses are on the north side of the road. On the opposite side, the houses, newer or rebuilt since the war, adjoin the cultivated area. In the older section, the dense shrubbery, the tree lined lanes, broken occasionally by stone fences, wind through the village with footpaths branching off, sometimes past an open field, a reminder of a failure to rebuild after the war. On the northern outskirts is the village office, its gong in the yard, the open field, a playground for the children.

133 Hanashiro and Oushichan villages to a broad semi-circular valley, the
361 Oushichan plain, with a gentle gradient sloping to the sea. Shortly before the coast is reached there is a sharper drop, and it is in this depression along the shore and the coastal strip that the fishing village lies.

134 The Okinawan clay loams and the Chinen stony clays are also the
133 predominating soils of the area. There are about 85 acres of the gently sloping clay loams, 155 acres of the gently sloping Chinen stony clays. While moderately fertile and well drained, these soils are also shallow and stony, with obvious defects for the pursuit of agriculture. There are 10 acres of deep, fertile poorly drained, slightly acid alluvial soils. These occur along the river and its estuary and in a small former river mouth to the south. There are about six acres in rough stony land.

731 The village has very little storm protection. There are no shelter
133 belts around it, nor are there many trees within. It is open to storms
419 and typhoons, and the water, lashed by the sea, is sufficient to break and scatter the large stones of the seawall. At present, inside the village there is none of the privacy typical of the agricultural villages
361 and their compounds. There are few trees, shrubs, or fences. In the
351 older part of the village, the houses are closely set together. Fishing
227 nets hang on the lines of the yard. In season, the yard is covered with drying fish, fish fins, and fish backs. The yards and the shore are dotted with men cleaning or repairing their boats.

362 The lack of natural beauty of the place is accentuated by the poor-
512 ness of the houses and the other buildings. Its atmosphere is unmistakably
484 different. The village is more commercial and more lively than the quiet and concealed agricultural village. Life is not so much of a routine, for much depends on the weather and the sea. The village has people who have travelled widely. Some of its fishermen have been in the waters of Java, of the South Seas, of the Andaman Islands, the Philippines, and Indo-China.

438 The village's main commercial contacts are with the remaining
[311] agricultural villages of the township from which it must obtain much of its food, for the area is not suited to agriculture, nor is much land available. For wider contacts, there are Itoman about 4 1/2 miles, and
494 Naha about 8 1/2 miles away. Buses go through the village twice a day.
368 The three wheeled cycles are irregular but come and go more often. Fish
574 is sold at Naha. The theatre for the travelling troupe of actors from Naha and for movies is in Horikawa across the river. Many visits are also made to Itoman to see relatives and friends.

727 The war was even more catastrophic for Minatogawa than for Hanashiro.
[361] Before the war, Minatogawa was a thriving, prosperous and well built up small town. About 70% of its buildings had a tile roof and 30% had thatch roofs. There were about 30 stores, sake shops and drinking places, including a geisha house, along the road, serving the fishermen and the stonecutters. Of the 430 buildings in the area, only three were left

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

standing. At one time, the Hinatogawa beaches were seriously considered for the initial landings in Okinawa, and later as a possible second landing. After the campaign for the south had begun, Hinatogawa became a forward loading point.[10] The present village has been completely rebuilt, and the newer buildings, with few exceptions, are frail and undistinguished. The war shows its effects, too, on the southern part of the village where there is a barren acreage, formerly the site of an army camp, its top soil so shallow that the bulldozers in levelling it soon reached the rock beneath.

Nearby Nagano is a village of a different type. It is divided into two distinct quarters, also a result of the war. The old part formerly was to the north in the main stonecutting area, but following the destruction, a new settlement was started in the farm land a few hundred yards south. Cultivation is marginal on the shallow soil of the sloping valley before it descends into the flat coastal area in which the fishing village is located.

Hinatogawa, which means River Port, is a distinctive village reminiscent of the famous fishing town of Itoman, though without its size, beauty, or color.

4

Matsuda

Matsuda is a here-and-there type of village. The village area including the community owned forest is over a square mile. The countryside is dotted with several small sub-settlements. Within each sub-settlement, the houses also are scattered about and separated from one another by large trees, thick growths of shrubbery, grasses, stone fences, and cultivated fields.

The village is located in Ginoza township (Ginoza-son) on the northeast side of the island. This township is in the northern district (Kunigami, or Yambaru). The village is on Highway 13, which winds along the northeast coast through Ishikawa, Kin, Kanna, and Ginoza villages.

Though near the sea, a typical site of a northern Okinawan village, it is a settlement engaged in agriculture and forestry. Its name suggests its nature. Matsuda is a compound of the characters for pine tree, matsu, and rice field, ta, da. Though there is some fishing in the sub-settlements along the Pacific shore, it is casual and a part time occupation for farmers on the coast. The families exclusively

[Text Continues TOP of P. 55--Analyst]

10 The statistics on village destruction are taken from accounts of the villagers. They are estimates. For operations in this area, see Okinawa, the last battle, as cited, 68, 74, 426-27, 436, 439.

842 need of succession is met, birth control measures might be accepted. There is, it is true, a widespread feeling that many children are a happiness which artificial control should not destroy. But this feeling, especially true with women, is often lost after the fourth or fifth child when mothers may dread further child bearing.[7]

[177] In the villages studied, there is an awareness of birth control. This awareness comes from conversation and reading, the primary sources being Japanese magazines and newspapers. I did not meet anyone who admitted practicing birth control or who desired to do so. According to the informants, it is not practiced at all. There may be some instances.

But birth control methods are not widely understood, and even if they were, it is doubtful that people would use them on their own initiative. The present apathy toward birth control methods may be due to the fact [167] that only recently has the question been of any significance. In the past economic difficulties within a family were relieved by emigration. There was thus little need to think of a limited family. On the contrary, there was pride in a family that might spread over continents.

[183] Historically, the whole emphasis in the family system has been on a large or a medium sized, not a limited, family, and this, even today, is tied in with family pride coming from having children and grandchildren. [562] If families have girls to begin with, the feeling is all the stronger. Though unusual, it is not unheard of to have a family of girls, and even if there are sons, there should be enough of them to take care of the hazards of death.

5

Conclusion

185 Among some villagers--and this seems to be independent of the degree of education--there are now more realistic appraisals of what the soil and the land can make available to a growing population and to their own children. Emigration for the time being is not possible. And, even if it were on a broad scale, it would not only have to skim off the present excess population, but take continuing care of future natural increases as well.

● 134 There were in all the villages several considerations that have influenced these appraisals. Land is insufficient, even in quantity, though in local areas such as Matsuda, it might suffice for local demands. The arable land is also poor. The poor and insufficient land,

[TEXT Continues Top of P. 69--Analyst]

[114] [208] 7 This dread of continual child bearing is discussed as an attitude, not as a general truth. The statement is based on conversations with men and women in each of the villages. Many women in Okinawa would not agree with this, but the attitude, I am convinced, if not a prevailing one, is at least frequent enough to be worth recording as something more than individual distaste.

combined with the destructiveness of typhoons, make for an unproductive life in terms of rewards for work done. To these, there is now being added a fourth realisation, that there are too many people in Okinawa. Greater mobility has increased this awareness.[8]

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8 These remarks, too, are based on impressions. Neither would I claim that they represent a majority opinion. Polls with samples competently chosen could only determine these attitudes. But complaints about the poorness of the land are proverbial among Okinawans. So are the discouragements coming from the typhoons.

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In this illustration, the first son receives slightly over 60% of the land, ignoring type and grade within type. There was general agreement in all villages that the grade of land within each classification (grades 1 to 4 in dry crop land, for example) had little significance in inheritance matters. The grade is more important for tax purposes.

The example also illustrates two other principles: the natural desire to keep contiguous or close in land within the main family, using inconvenient or far off land where possible for house sites for branch families, or for arable land for second and other sons. In this illustration, the shares of the second and of the third sons could be equalized by subdividing plot #6, although its small area would not make it worth while, as 75 tsubo is a very low average size for dry crop land.

Another practice, noted in Hanashiro and in Matsuda, is that the first son receives everything on the retirement of the father. This may be contrasted with a situation in which the father divides the property before younger sons marry and establish branch families. In such cases, the father might take the income from part of the property. But the more general practice is for the father to give all to the first son. Fathers may also make a will. When the first son receives all, it is the custom for him to hold property which the younger sons will need in establishing their branch families. It is in cases where the first son is given full disposition of the property that quarrels are most likely to occur, for much depends on the generosity and sense of fairness of the elder brother.[3]

In Hanashiro and Minatogawa, it is important that younger brothers receive genya land. Genya is often translated as wild land. In Japan the term is usually used to describe treeless, waste, hilly, rocky, or rolling land unsuitable for cultivation. In Okinawa, the genya land may be in the center of a rice field; it may be a rocky mound with cultivation around it. It may be land in the mountains. It is almost invariably in grass (miscanthus) with an occasional cycad or scrub pine. It is not owned in large tracts. In Hanashiro, the largest single parcel is 4564 tsubo (3.77 acres), in Minatogawa 1333 (tsubo) (1.9 acres), and in Matsuda 6398 tsubo (5.28 acres), but these are far above the average. In Hanashiro it is important because grass is constantly needed for thatched roofs and other uses. The importance of genya and its grass was well illustrated in Minatogawa after the typhoon, Ruth, of October 13-14, 1951. These villagers own little land and many have no genya. They were obliged to buy the grass to replace the roofs of many of the frailer houses which had been partially or completely destroyed by the typhoon. Genya is also used for family tombs. In Hanashiro, the genya

[Text continues TOP of P. 133--Analyst]

3 The problem can be appreciated by analyzing the acreage areas of each classification of land and the grades within it, bearing in mind that the avorage farmer has hatake, genya, and often rice paddies. These statistics will be given in the following chapter.

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[824]

In Hanashiro, The genya

grass and shrub are essential as a substitute for firewood. In Matsuda with large areas of community owned forest, this genya is not so important to the individual family.

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In considering the inheritance of land, it is essential to understand that a family needs different types of land. Not everyone has rice paddies, but parcels of dry crop land and genya in the south are necessary to existence.

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If the practices of these three villages are indicative of the division of family holdings in general, the first son obtains between 50% and 60% of the land in addition to the house site. The remainder is divided, often equally, among the other sons. In the poorer families, if the sons are widely spaced, there may be enough left over for the second son, but when the third son reaches marriageable age, there may be nothing for him. Instances of this type were observed in the village. One young farmer of Minatogawa, a third son, said he received nothing, and set out by himself, first through wages, and then through small purchases to acquire his present modest land holdings.

This discussion may suggest a greater rigidity in the system of inheritance than is actually the case. It may give the impression of a series of families headed by the first son with most of the property and with younger sons and their branch families struggling along on what land can be spared for them. There has been, for historical reasons, more fluidity than this. The large number of heads of families who themselves are not first sons indicates that many second to fifth sons as well as daughters ultimately come into control of a family estate.

There have been four main reasons for this. (1) Emigration of first sons before they became of age. They left to earn a living in foreign countries to support their parents in the villages, became established and postponed to an indefinite future their return to Okinawa. Since the end of the war, according to relatives who are living in the village, many of these have no intention of ever returning except to visit. (2) Deaths of first sons without issue, and the succession of other sons or daughters. (3) Heavy war losses, especially of males. Some of these naturally were first sons, opening the way for the succession of young widows or second sons in the case of the unmarried first sons. (4) Deaths from catastrophes like typhoons, and in the case of Minatogawa, the losses of fishermen at sea.

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Inheritance practices with private ownership of land follow logically from the family system. They are a means of providing the economic base by saving the estate for future generations, at the same time providing where possible for sons not in the direct line of succession. Inheritance is a connecting link between the family system and land use and land tenure. Present land use and land tenure are an interesting example of the modifications that a system of social organization, the family system, has made on the natural environment.

311 243 be lowered. If the rainfall is unusually low, the estimated yields may even be cut in half. Grade differences are also shown by the Oushichan tax table on rice land:

Class	Rate in Yen (per tsubo)
1	37
2	34
3	31
4	28
5	25
6	22
7	19

[651]

311 The grading of dry crop land is not so simple because various crops can be grown and there are difficulties in making equivalences of yields. The grading is more subjective and vague, with gradations based on the judgment of the land committee. It might seem that the grades of dry crop land based on subjective judgment would be difficult to agree upon. This is not the case. Farmers who have lived in the village all their lives, and who as children remembered the experience of their fathers, know their own and their neighbors' land well. Representatives from the village who suggest the grades are chosen by the farmers for their honesty, skill in agriculture, and knowledge of the land.

311 134 133 Depth of the soil, flatness, degree of stoniness and accessibility are the most important criteria. The first three of these follow naturally from conditions widespread in Okinawa. There often is very little topsoil. One can observe cuts in roads or sharp declivities which show soils only an inch or two deep before meeting the consolidated or unconsolidated rock below. The hilly and mountainous nature of the island enforces cultivation on slopes, summits, and rolling hills. Stoniness, whether large boulders or small pebbles or both is common. One of the occupations of the old in Minatogawa and Nagano is to convert stony to arable land by tediously picking up the stones and throwing them into piles for subsequent sale in road building. But often the boulders are so large that cultivation must curve around them. These conditions can be seen to good advantage in Nagano. In Hanashiro, the soils are flatter, less stony, and deeper. Matsuda has wide areas of poor shallow and stony soils.

[887]

[291] First class hatake land, then, is flat, deep, with few or no stones, and suitable either for sugar or the sweet potato and the various common vegetables.

311 With this standard of first class hatake land, the other grades are judged, mostly by inspection and through consultation and agreement by the committee. In the Oushichan township, there are ten such grades of hatake land, the tenth grade being so poor that it is virtually genya land. In dry crop land, probably the most important

single criterion is nearness, providing the land has possibilities. Good land, unless of substantial area, if remote and far from roads, is very time consuming and inconvenient.

Genya land in the Oushichan area has two grades. The criterion here is the presence of grass and small shrubs that can be used for firewood. Grade two genya grows little or nothing either because of the large boulders or because it has too many small stones or unconsolidated rock with little vegetation. If it were not for stones or such topographical factors as steepness or ruggedness, some genya land could be classified as poor grade dry crop land. There are, as in rice land, tax differentials according to grade of hatake and genya land:

Grade	Dry Crop Land Tax in Yen	Wild Land (Genya) Tax in Yen
1	13	2
2	12	1.80
3	11	
4	10	
5	9	
6	8	
7	7	
8	6	
9	5	
10	4	

In Ginoza-son, the land classification system is substantially the same. There are six different grades of land classified according to yield in go per tsubo. (A go is 1/1000 of a koku, a tsubo about 4 square yards).

Grade	Yield	Remarks
1	5	Two annual plantings.
2	4	Two annual plantings.
3	3	Dependent entirely on amount of estimated rainfall.
4	2	
5	1.5	
6	1.0	Mountain paddy, very uncertain, depending on rainfall; occasionally two crops a year are possible.

Dry crop land is judged by criteria similar to those in Oushichan-son. Grade 1 is good soil and convenient to water with good yields as shown by experience. Grades 2 and 3 are convenient to water, but soils are of lesser quality. The classification is also based on experience. Grade 4 is in low places, generally narrow ravines between steep wooded slopes. Grades 5 and 6 have little or no water, are stony, and inconvenient.

In the areas studied, no serious sheet erosion was observed
No doubt this may be a problem in parts of Okinawa, but it is doubtful that this menace will threaten the habitability of the island. Occasionally one can see a freshly hoed field on a slope that is losing its soil during a downpour. But the fact that the hills and mountains are covered with vegetation, are not too steep, and that grasses and shrubs are cut off allowing the stubble with the roots to remain in the soil effectively binds the soil of the hills and at the same time prevents flash floods. With the exception of stony soils, the land of the areas studied had a plant cover. This statement is not inconsistent with the previous remarks regarding deforestation, as the disappearance of the pine, the cycad, and the pandanus has been offset by the spread of kaya (miscanthus) grass. Boundary paths also keep the soil in place. They often roughly follow the slope and are sufficiently crooked and winding and of sufficient depth to prevent washing away of large quantities of soil. While there is no complex irrigation system in these areas, the small ditches which carry the water down the slope are winding and covered on their borders by weeds. Occasionally one can see a farmer shovelling up the soil accumulated in a natural catchment in a bend of one of these ditches and restoring the lost soil to his land.

134 133 137 185 [487] [317]

In all areas, equally simple devices to protect the soil could be observed. Roadside borders of stone, like the stone of a rock garden, often line the fields adjoining main roads. (One could write a long essay on stones and the part they play in the culture of the people). These stones come from the fields. If fields do not have stone borders, weeds are left to grow. They are cropped, but the roots are left in the soil. In Hanashiro, stone fences on slopes and contour breaks are a common sight. Sometimes these have the appearance of blunt wedges, the end of the wedge going up the ravine. These stones have been painstakingly gathered from nearby areas.

185 417

Terracing is practiced in a crude form in these areas. It really is step or bench cultivation, the plots being above one another in step like order. The function of terracing is, in the case of the dry crop land, to bring more land under cultivation, protecting it from washing away; in the case of the rice fields, it supplies flat land for cultivation at different levels. In the areas studied, terracing did not go all the way up the mountain side, although this practice can be observed in parts of Okinawa.

185 241

Very frequently the ledges of the terraces are covered with a border of weeds or cropped grass which prevent soil runoff down the hill. In the Hatsuda area, rice is grown up a narrow mountain valley, or ravine, with trees and shrubbery on the hillsides growing to the very edge of the cultivated plots. In rice terracing, the boundary paths often divide one step from another with openings in the ditches to allow the passage of water to the level below.

311 Slow conversion of land to arable fields is constantly going on in situations in which the amount of labor involved is not even considered. One such activity in the Hinatogawa area is typical. [134] Originally the field could not be worked because of the large quantities of smaller boulders, stones, and pebbles, all small enough to be carried off, too numerous to encourage hopes for quick [412] transformation. With difficulty this land is worked with the short handled broad bladed hoe. The hoes with two or three prongs are [462] used for softer soils. This hard hoeing is often done by women. The surface stones are thrown aside into little piles along the road. [491] These can now be sold for use in road construction. The vegetation on the surface is also turned under. Later in the year, after the rain has gone into the loosened soil, it is hoed again, and this time it is possible to go in deeper. Weeds, rice straw, unused miscanthus, straw from the pig or goat pen may be added, and this is allowed to rot in the soil. Then the field is hoed again, and the deeper rocks and stones, and those left behind before, are unturned and the process is repeated. In the end, and this period may vary from one to several years depending on the quantity of stones, the farmer has a plot of [134] land, of a rich chocolate brown color, of fair texture and fertility, suitable for growing sweet potatoes.

133 311 In Matsuda, there is a slightly different situation. The topography here has a different character than that of the south. Hills, caves, sinks, and slopes are everywhere, and as a consequence, cultivation is more scattered. In the southern villages, land use follows a more recognizable pattern. The low flat areas are used for rice, the higher parts of the flat land and the slopes and the rolling upland for dry crop land, while the highest parts on the hill or mountain summits are in grasses, shrubs, and scattered scrub trees. In Matsuda, these are all mixed up. Rice may be growing in a genya area. In another part of the village, sweet potatoes may, in a similar situation, be the rule. This crazy-quilt pattern of rice, genya and dry crop land, all adjoining, stimulates the gradual conversion of genya to arable land. When rice is made out of the genya land the converted plot is known in Okinawan as gata. It is a laborious process of clearing, removing stones, hoeing, cutting perpendicular sides, making a hard surface to contain the water for the rice that will be grown. In some sections of Matsuda, the very small valleys have been converted to S-shaped rice plots.

311 134 Casual observers often see unused land and conclude that large amounts can be reclaimed. They do not see the stones, or the hard-rock which may be an inch or two below the surface. They would do well to look at village maps to see how these lands are regarded by the villagers who have tilled them. Probably more efficient conversion and reclamation could be carried on with machinery and with the generous use of fertilizers.

311 185 In the desire for more land, it should not be overlooked that the great conservation value of genya land and the poorer upland

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

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Not all of the upland or slope cultivation is done by terracing, as we have seen. Crops other than rice are often grown on hillsides, or up slopes, less often following the contour of the land. The precautions here are also suited to the cultivation: weeds or grasses grow along boundary lines or divide off sharp drops, or small stone fences may be used.

In Nagano, where there is no rice grown, there is little water from these sources. It comes from rainfall and amounts of sugar cane and sweet potato that are grown depend on its quantity and regularity. Water regardless of crop is a constant problem. [312]

In Okinawan agriculture, constant fertilization is necessary. There are too many people to leave land fallow in ordinary times. Each plot must be used if the farmer has the time and energy to do so. Since the island is in a humid subtropical climate, the organic materials in the soil (humus) are quickly oxidized. Porous soils encourage the leaching of minerals from the top soil, especially with torrential rains. The fewness of domestic animals increases the dependence on plant residues and artificial fertilizers. One of the commonest complaints of the Okinawan farmer, in addition to the poorness of his soil and crop damage from typhoons, is that it must be unceasingly fertilized. It is a treadmill. He must walk fast to stay in the same place. [134] [231]

There is very little difference in the use of fertilizers in the communities studied. Fertilizers most frequently used are:

(1) Composts. A typical mixture (though there are many combinations) may be composed of dried miscanthus, or any kind of grass, ashes and cinders, perhaps some pieces of charcoal, and goat droppings. This is left a month outside in a pile and put on the fields and hoed under.

(2) Plant residues. These are put on the soil, both of paddy and dry crop land, and hoed under. Plants are the greatest single source of fertilizer. The cut over rice plant is turned under in the paddy field. Tops of the sweet potato, if not used as slips or for food for animals, miscanthus grass, and burned rice hulls are other sources of fertilizer. [824]

(3) Animal manures mixed usually with pen grass. Animal fertilizers are not abundant, an indirect effect of the war which greatly reduced the number of horses, cattle, pigs, goats, and the smaller domestic animals. When available, goat, pig, or horse manures are used. Pig or goat pen grass is gathered up and spread on the fields. Pig manure is the best source of animal fertilizer, for pigs are the most numerous of the larger domestic animals. [927] [237] [231]

(4) Night soil. The use of night soil, called jinpun in Okinawan, has declined from pre-war times. It is often said that it is not used at all. But this statement must be qualified. It is [514]

of the young shoots from the seed beds to the paddy field, (4) the care of rice until its maturity, (5) the harvest, (6) threshing, milling, and hulling, (7) the uses of rice and its byproducts, and (8) types and preferences of rice. 243

The preparation and laying out of the seed bed. A seed bed (naidoko) is a plot of first grade land, well watered, specially chosen for this purpose. It is very small in area, often around 15 tsubo, or about 540 square feet. The seed bed also may be a portion of a larger field set apart for seedlings. In this case, small boundaries are made by earthen walls, apertures left for water to flow in and out, and the little plot is then prepared for the seedlings. Considerable care is taken in the preparation of the seed bed. The soil here must be finer and more carefully worked than the paddy field, since it receives the rice seed, not the seedlings. The soil is painstakingly worked, and, with the water added, becomes a thick smooth mud. Commercial fertilizers, composts, and less commonly, night soil are then applied. After the seed is sown, water, perhaps 2 1/2 inches deep is allowed in the bed. During germination, a slow steady irrigation, a washing by new water is maintained by controlling the water trickling in and out of the openings on either side of the field. [311] [134] [312]

The selection of the seed. The seed is taken from the harvest immediately preceding. After fall harvest around December, the rice fields are dug to prepare for the new planting in January or February. The seed used from this crop is tested in one of two ways. 243 242

In Matsuda, it is common for a farmer to fetch a bucketful of sea water. To this he adds a little more salt until the density of the water is sufficient to float an egg. The rice seed is put in the water. The light and undesirable grains rise to the surface. This salt water density method is apparently very old and originally came from China. [177]

Another method, based on the same assumption that the lighter grains make undesirable seed, is used in both villages. The rice is tossed in a round, shallow, winnowing basket, and the breeze carries off the undesirable seeds to the chickens. In the summer planting the seed, after this testing, is ready to sow. In the fall and winter planting, there is one further step. After the seed has been selected by the winnowing or the density method, it is soaked in water for four or five days. Following this, it is removed from the water, put in a tub, and covered. Warm water is added, the mixture is stirred and allowed to stand for another four or five days. The water is then poured off and seed has begun to germinate. The seedlings can now be planted in the seed bed.

Transplanting the young shoots from the seed bed to the paddy field. In the meantime, the paddy fields have been prepared. After the harvest, the field is drained. Small clumps of cropped rice stalks stick up two or three inches where they have been cut with the small sickle or bill knife. This stubble is turned over either by hoeing, the usual way, or 243

CHAPTER I: GEOGRAPHY

F. R. Pitts

[1?] Location Okinawa is a longish island, lying about halfway between Formosa and the southern tip of Kyushu. Together with clusters of islands lying both to the east and west, it forms the political unit known as Okinawa Guntō.

133 Along the axis of Okinawa, which trends from southwest to northeast, there is a fairly simple division into a plateau-and-mountain northern half, a central plateau area, and a low rolling southern knob. The Motobu peninsula juts westward from the northern, or Kunigami, half and forms a distinctive area. Between the Kunigami mountains and the peaks of Motobu lies the ricebowl of Okinawa---the Haneji lowland.

311 241 Arable Land In general it can be said that the farm population increases as one proceeds south. Map 2, showing the arable land under cultivation as a percentage of the total land area, illustrates this.[1]

Farms in the mountain and plateau north are found in incised V-shaped valleys. Water is plentiful, and rice paddies cover the valley floor. Villages hug the edges of the flat land, and incredibly small sweet-potato terraces rise [137] up the valley's edge. Atop the plateau one finds only silence, and a dense growth of trees and bamboo. Many of the people in the valleys are part-time [132] foresters. The Motobu mountains guard from the frequent typhoons little settlements famed for growing the indigo plant and pineapples. The peninsula's north shore is a fertile but ever-narrowing extension of the Haneji lowland.

In the central plateau area---Nakagami---sweet-potato fields compete with scrubby forest for space on the plateau. Where sufficient water is available, rice fields cover the tiny valley floors and the low-lying coastal fringes. The triangular southern end of the island is known as Shimajiri in [134] popular terminology. Shimajiri is blessed with the greatest concentration of [132] fertile arable land on Okinawa. But the blessing is somewhat reduced by greater exposure to typhoons and a chronic water shortage. Sweet potatoes and sugar cane rank first among crops here.

311 313 [241] Riceland Okinawans prefer to eat rice rather than sweet potatoes whenever possible. It is a paradox, however, that areas of greatest farm population grow the least rice. The thinly populated north has the greatest amount of riceland. Map 3 charts the distribution of riceland---or flooded fields---on Okinawa. Even in the southern 'son' of Yonagusuku and Kanegusuku flooded fields often contain the mat rush rather than rice. It is a good cash crop, and is sturdier than rice when typhoons roar through the islands.

[128] [1] The figures upon which the maps in this section and the population section are based are found in Appendix A. The figures for Japan and Kagoshima-ken are given for comparative purposes. Of all the prefectures in Japan, Kagoshima most nearly resembles Okinawa in climate and emphasis upon sweet potatoes as a staple food.

[Kitazato]

175 621 727 It is said that the division of the village cut across family lines and that the motivating factor in a household's choice of one site over another was the location of their remaining landholdings on the periphery of the village. Another factor was the presence of relatives in neighboring villages from whom they might secure land for rental. Thus, Kijikina is largely made up of households which have their lands on that side of the field or have relatives in neighboring Furushima; the Hama people mostly own the land at the north side of the field.

175 621 The Pre-war Village Prior to the war the village was, according to 'son' officials, a very prosperous community and a great economic asset to the 'son'. It possessed nearly 173 acres in arable land, most of which [234] was flat or gently rolling. The soil was well suited to sugar cane which [334] was the chief source of income for the village; cattle-raising for export [235] to Japan provided an additional source of income. [434]

Unlike Kanegusuku the lineages were said to be rather weak in Kitazato; there were a number of different kin groups, and no one of these was [360] dominant. The houses of the village were not tightly nucleated like those of the typical Okinawan village but were scattered about in a loose grouping in the midst of the best agricultural land.

621 311 727 Land Loss At the present time (May, 1954) approximately 39% of the total land area of this village is in airfield, and an additional 34% of the total area has been ruined by activities related to its construction (sand dumped onto fields, top soil removed, erosion, etc.). There remains but 27% of the total land area for the use of the villagers, and of this only a small percentage is in arable land, since most of the good, flat farmland was lost to the airfield. The total amount of arable land remaining is [134] 11,895 'tsubo' (less than ten acres), and this averages out to about 148 'tsubo' or 0.12 acres per household, with approximately five persons in each house. The average amounts of arable land per household in Kanegusuku, Okinawa, and Kitazato compare as follows:

Kanegusuku	---	1514.2 'tsubo'
Okinawa	---	1037.2 'tsubo' (per farm household)
Kitazato	---	148.7 'tsubo'

Land loss to the airfield affected every family in the village; some families lost all of their lands, a very few managed to retain most, but the majority of villagers (70%) lost nearly all of their holdings. For example, the mayor of the village held 2470 'tsubo' before the war and now has 570 'tsubo' left; yet, he is considered one of the more fortunate. To compensate for their losses they now farm some land which was previously left idle: "We would not have farmed such land before the war as we are farming today." Some have rented lands from neighboring villages, and a few have been given land by relatives in these villages.

621 829 727 Land Payment The people of Kitazato strongly feel that they are not being paid adequate remuneration in terms of current rental values for their land. They are well aware of the fact that the same U. S. military